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ABSTRACT

Locating and assessing new and emerging occupations is a required task for those vocational/technical educators who want to prepare for meeting the needs for skilled workers in the future as well as for those currently in demand. This ongoing process requires contact with a wide range of people and organizations. Information concerning job duties, education and training requirements, employment outlook data, employment settings, career opportunities, agencies and individuals to contact, and existing program offerings all must be assessed when examining a new occupation. Educators must monitor state and national legislation and resulting policy implications, changing economic conditions and social values, and technological developments. Information about jobs can be gained from employers, professional associations, special interest groups, newsletters and publications, and personal conversation and correspondence. Occupational projections available from both traditional and less expected sources should be analyzed by the vocational/technical education planner even when "new" jobs as a category may not be included. State Occupational Information Coordinating Committees may be especially helpful; or surveys of employers can provide occupational projection data as well as other information needed to plan for vocational/technical training. Local factors must always be taken into account prior to implementation of a program for what appears to be a new and emerging occupation. (KC)

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IDENTIFYING NEW AND EMERGING OCCUPATIONS FOR VOCATIONAL/TECHNICAL EDUCATION PLANNING PURPOSES

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IDENTIFYING NEW AND EMERGING OCCUPATIONS FOR VOCATIONAL/TECHNICAL EDUCATION PLANNING PURPOSES

The promise of vocational/technical education is to prepare persons for employment while meeting employer's needs for skilled, trained workers. But employer's needs change, which alters the required preparation for employment. If vocational educators have an effective, working relationship with business/industry they should be making adaptations in existing curricula as changes are happening at the worksite. However, knowing when to initiate programs for new or emerging occupations can be a more difficult task. Orville Nelson has noted that--

> With emerging or newly emerged occupations, the traditional vocational curriculum development processes do not work as effectively (as they do with established occupations). These traditional processes require existing jobs which can be analyzed to determine specific tasks which are required in order to successfully do the job. In emerging or newly emerged occupations the jobs are not defined sufficiently, there is often a small number of employees in these occupations, and the jobs are evolving (1978).

The purpose of this paper is to outline some of the means available to educational planners at the local, state, and national levels for identifying new and emerging occupations for which vocational/technical training may be appropriate.

Problem Statement

The Education Amendments of 1976 state that one priority for funding within vocational education shall be those "programs which are new to the area to be served and which are designed to meet new and emerging manpower needs and job opportunities" (U.S. Congress 1976). Samuel Halperin, Director of the Institute for Educational Leadership of George Washington University, has indicated that according to his own informal survey of key congressional staffers, one of ten major concerns regarding vocational education was that, "although Congress has been urging training in new job areas, vocational education insists on maintaining old categories (e.g. trade and industrial, agriculture, etc.)" (1978). Obviously the federal policymakers want vocational/ technical education to be current and up-to-date.

Unfortunately, meeting the legislative mandate and addressing this concern is not simply a matter of checking with those employers presently serving on advisory committees to see if they have any new job titles within their organization. The process is more complex. It can be difficult finding out about a new techology which has caused a demand for a new type of trained individual. Unless one is an expert in the given technology, he or she may even have difficulty in recognizing a procedure or product as

being new. Or, a new and emerging occupation may be the restructuring of a more traditional occupation, in which case the job title is the same, but the duties, and therefore training needed, are different.

Even when one does find what appears to be a new and emerging occupation it is important to be sure the cart is not in front of the horse. The potential for employment after graduation must be large enough to warrant a program that trains a given number of students. Training which is designed and in place prior to sufficient demand for employees is only a disservice to the interested students. For example, training for solar energy technicians may or may not be justified dependent upon the locale and available work force. Most people are aware that alternative energy resources will have to be tapped in the future to maintain American's current life styles and productivity. However, this fact alone does not translate immediately to a need for training for solar energy technicians. In the first place, the costs for solar energy have not, in all cases, outweighed the benefits of some more traditional sources of energy. This economic factor has slowed the rate of change. But, maybe more importantly, persons in traditional occupations such as plumbing, carpentry, and sheet metal work may fill the demand for solar installations and repair for the next few years with only a little additional training (Forgione and Kopp 1979). Therefore, the excited

vocational educator who is anxious to help with the energy problem, as well as to prepare individuals for work, could create a situation where newly trained solar energy technicians might be unemployable in their field of training for a few years. This is not to say that training of solar energy technicians is inappropriate thoughout the country, only that what appears to be a very likely candidate for a new vocational education program must be carefully examined prior to implementation.

Another difficulty in assessing new and emerging occupations is the problem of comparing the need for employees (demand) with qualified applicants for employment (supply). If there is a projected need for radiologic technicians, for example, in Western Nebraska and no formal training program exists, when is the demand large enough to merit consideration? The answer to this question must be determined at the local level after a sufficient examination of current supply. If there is no formal training program in existance, where have the current radiologic technicians obtained their training? Perhaps migration to the area or on-the-job training at local hospitals provides the present supply. Maybe doctors and hospitals must conduct national recruiting or pay very high wages to attract radiologic technicians. If supply seems totally adequate the occupation may not be as new or as different as perceived originally.

Defining the term "new and emerging" is the first step in the process of planning for vocational/technical programs in new and emerging occupational areas. Delineating the information needed about the occupation is a logical next step. Collecting the information from as many sources as possible (to increase the validity) follows. After identifying and studying a new and emerging occupation several questions remain to be answered prior to implementation of a new program. Each of these steps will be examined within this paper and the results from several recent studies will be summarized.

A Definition for New and Emerging Occupations

A recent national study commissioned by the Department of Education has defined the term 'new and emerging occupation' as one which meets the following criteria:

1. projected employment growth on a national level;
2. emergence over the last decade;
3. development arising from
   a) the creation of a new industry or occupations (for example, the computer industry with selected new occupations such as computer programmer);
   b) the significant restructuring of existing occupations (for example, the physician's assistant); and

c) modifications of required skills in existing occupations (for example, word processing) (Orth and Russell 1980).

This definition would be modified, of course, for a state or local level to require employment growth for a more relevant scope (city, county, region, or state-wide).

Another interpretation of a new occupation is provided by the Oregon Occupational Information Coordinating Committee.

> New occupation: an occupation whose major tasks, skills, and duties are not included in any currently existing occupation or whose tasks are combined in significantly different ways that preclude workers from other occupations performing the work without training beyond a short demonstration (1980).

A concept which one must keep in mind while researching new and emerging occupations is that many more occupations are changing in nature. These changing occupations may involve greater numbers of workers and actually be of greater import to the vocational education community. The research techniques and questions to be asked about new and emerging occupations also apply to changing occupations.

> Changing occupation: An existing occupation that has experienced change in duties, skills or tasks significant enough to require training beyond a short demonstration, but not significant enough to classify into another occupation or create a new occupation (Oregon Occupational Information Coordinating Committee 1980).

Information Needs

In order to actually determine if an occupation meets the previously cited criteria as 'new and emerging', information about the job must be collected. The National Center for Research in Vocational Education has delineated seven categories of information which aid in the analysis of new and emerging occupations and the need for curriculum development.

1. Job Functions, Duties, and Specifications
   - A. Job description and/or duties
   - B. Alternative job titles
   - C. Wages, hours, barriers, and constraints

2. Education and Training Requirements
   - A. Degree or certificate program
   - B. Apprenticeship
   - C. Professional standards
   - D. On-the-job training

3. Employment Outlook
   - A. Projected growth, expansion or replacement
   - B. Geographic factors

4. Employment Setting
   - A. Industry
   - B. Product or service
   - C. Size of employer
   - D. Usual recruiting and hiring

5. Career Advancement Opportunities
   - A. Present source of workers
   - B. Career ladder possibilities
   - C. Transferable skills

6. Available Curriculum and Programs
   - A. School, college, military offerings
   - B. Instructional materials
   - C. Association related training

7. Implications for Curriculum Development
   A. Level of needed training (secondary, post-secondary, certificate or associate degree)
   B. Need for whole curriculum, parts of curriculum, or combining of curricul.
   C. Adaptation possibilities (from existing curricula)
   (Russell 1981)

It may be impossible to gather all of the above data, and some questions may even be unanswerable due to the newness of the occupations being studied. This occurs because job duties are often not yet well structured. Employment outlook figures may be difficult to obtain also. These projections are often based on past industry production and expected demand for products and services. Therefore, if an emerging occupation is located within a newly created industry (perhaps due to technological development), standard projections will not be available. Fifteen years ago few could predict the demand for computer-related personnel which has occured because of the difficulty in predicting computer capacities (Ascher 1978).

Regardless of the difficulties in obtaining information about job descriptions, education and training requirements, employment outlook and setting, and career opportunities; this information is critical in examining new and emerging occupations for vocational education planning purposes. The following section of this paper will provide suggestions for the initial identification of new and emerging occupations and the information collection process which must be carried out.

Identifying and Analyzing New and Emerging Occupations

The process of identifying and analyzing new and emerging occupations is not cut and dried; it needs to be on-going and it involves many types of input. The process can include futures projections, trend extrapolation, employer surveys, expert testimony and, sometimes, hunches. In addition, the information which is required is often available only from scattered sources such as professional organizations, state employment services, and technical literature. According to the study of Current and Future Employment Opportunities in New and Emerging Occupations within Illinois, the identification of new and emerging occupations requires:

1. consideration of the variety of forces and processes which impact on occupations;
2. a flexible and mulci-faceted approach; and
3. ingenuity in utilizing existing data sources to estimate (local) demand (Drewes 1978).

Nickerson suggests the following four steps for identifying new and emerging occupations:

1. isolate trends and processes affecting the emergence and development of new occupations
2. identify occupational data bases and employment forecasts to designate occupational areas and specific job titles for further investigation
3. develop an alternative means for demand and growth rate estimates

4. discuss with knowledgeable employers and/or other organizational representatives data information on candidate occupations (Nickerson 1978).

Figure 1, "Methodology for Identifying New and Changing Occupations with a Curriculum Development Need," outlines the process used for the study of new and changing occupations conducted by the National Center for Research in Vocational Education (Orth and Russell, 1980).

The following sources and types of information can all be useful in examining new and emerging occupations:

- professional associations;
- technological forecasts;
- Bureau of Labor Statistics and State Employment Service occupational projections;
- literature reviews of related studies of new and emerging occupations;
- legislative trends;
- expert testimony;
- surveys of employers;
- economic and social trends;
- industrial projections;
- concensus opinions of a group of knowledgeable individuals (using delphi or nominal group process); and
- curricula clearinghouses.

These sources will be explored more fully regarding how they may be accessed, designed, or used to further one's understanding of a potential emerging occupation.

METHODOLOGY FOR IDENTIFYING NEW AND CHANGING OCCUPATIONS WITH A CURRICULUM DEVELOPMENT NEED

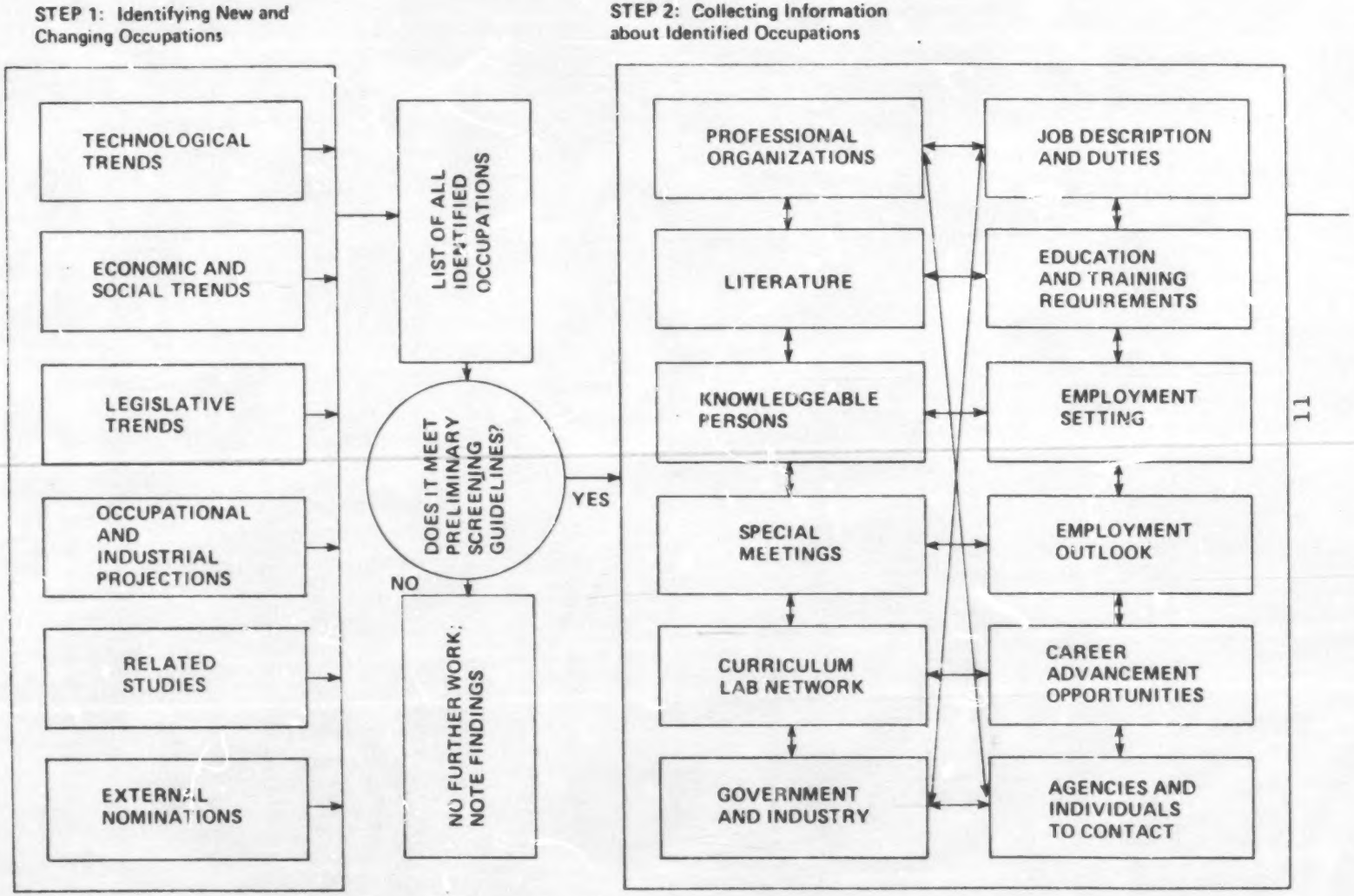
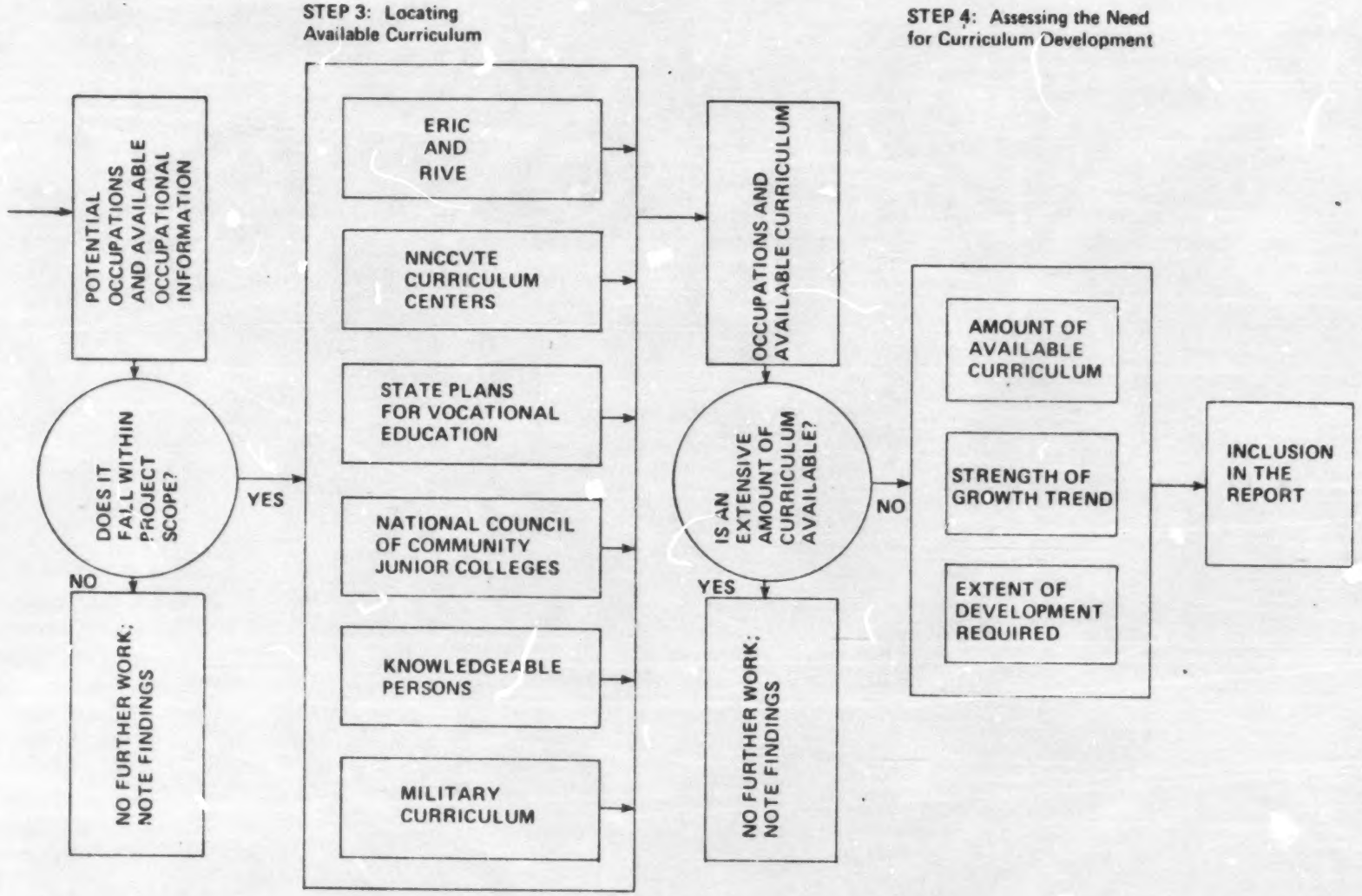


FIGURE 1


STEP 3: Locating Available Curriculum
STEP 4: Assessing the Need for Curriculum Development
POTENTIAL OCCUPATIONS AND AVAILABLE OCCUPATIONAL INFORMATION
DOES IT FALL WITHIN PROJECT SCOPE?
YES
NO
NO FURTHER WORK; NOTE FINDINGS
ERIC AND RIVE
NNCCVTE CURRICULUM CENTERS
STATE PLANS FOR VOCATIONAL EDUCATION
NATIONAL COUNCIL OF COMMUNITY JUNIOR COLLEGES
KNOWLEDGEABLE PERSONS
MILITARY CURRICULUM
OCCUPATIONS AND AVAILABLE CURRICULUM
IS AN EXTENSIVE AMOUNT OF CURRICULUM AVAILABLE?
YES
NO
NO FURTHER WORK; NOTE FINDINGS
AMOUNT OF AVAILABLE CURRICULUM
STRENGTH OF GROWTH TREND
EXTENT OF DEVELOPMENT REQUIRED
INCLUSION IN THE REPORT

12

On-Going Monitoring Activities

Indirect monitoring of possible new and emerging occupations is best carried out as an on-going process. This process involves being aware of and actively striving to stay abreast of developments that might affect or create new occupations. Monitoring activities include the examination of legislative trends (possible at the federal, state, and local levels); social and economic trends; and technological developments and forecasts.

Legislative trends can and have affected both the instigation and growth of numerous occupations. If legislation or policy mandates, for example, that a new monitoring or evaluation task is to take place on a large scale basis, highly specialized jobs can be created overnight. Legislation and policy decisions at the national level have affected new and emerging occupations particularly in the areas of:

safety and health;
environmental protection;
energy conservation;
energy production;
rights of individuals in institutions; and
consumer protection (Noleen 1976).

Legislative and policy trends can be monitored through

The Congressional Record (U.S. Congress on-going periodical), newsletters from government agencies and watchdog agencies, and through everyday media. The local librarian would be most helpful in procurement of these up-to-date sources of information on legislation and policy which may affect occupational growth; or, one can contact a related state department's public information office.

Monitoring economic and social trends is a very similar process. Documents such as Job Bank Frequently Listed Openings Report (Job-Flo) (U.S. Department of Labor on-going periodical) are available from local job service offices or the U.S. Department of Labor, Employment and Training Administration. This report can provide useful information to the new and emerging job watcher. Economic conditions can affect the growth of new jobs. For example, recessions often affect manufacturing industries and consequently, production-oriented occupations. The current energy and resource shortages point to such problem-solving occupations as "energy efficiency technician" and "recoverable materials coordinator" (Drewes 1978).

Growing awareness and social reform in the areas of mental retardation and physical handicaps have affected the labor market. Demographic population shifts from a large youth population to a growing adult and aging population (Morrison 1979) have already affected the need for teachers in elementary and secondary schools negatively, and may

affect the need for geriatric aides positively. As with monitoring legislative trends, the examination of economic and social trends is best accomplished as a day-to-day, current events style process. These trends may, at any time, impact upon legislation or policy and corporate decision making in such a manner as to create a demand for a new product or service. The Futurist Magazine is an excellent source of information about trends and developments in many areas (Cornish on-going periodical).

Monitoring technological developments can be quite complex. The Office of Technology Assessment of the United States Congress has the primary responsibiltiy of examining the implications of technological developments (so as to avoid unexpected, undesired side-effects). An extensive discussion of the methodolgies for both technological forecasting and technological assessment can be found within the Handbook of Futures Research (Fowles 1978).

Examples of several occupations for which there may be increased demand due to technological advancement are those related to laser/electro-optics, video discs, telecommunications, bio-medical diagnostic equipment, and computer graphics.

The National Aeronautic Space Association produces NASA Tech Briefs on a quarterly basis (on-going periodical). These documents provide a synopsis of technological devices and systems created at research and space centers across the

nation. Contact names and addresses are included to allow for further follow-up. NTIS Tech Notes are one kind of information provided by the National Technical Information Service (U.S. Department of Commerce on-going periodical). This service describes new technological developments in many fields.

Knowledgeable Groups and Expert Opinion

One way to maintain an effective flow of information about economic, legislative, social, and technological changes is through communication with special interest groups, advocacy organizations and professional associations. These groups usually exist at the local, state and national levels and can provide data and/or knowledgeable opinions on subjects which may not be treated anywhere else in the literature or media. Professional associations often survey their membership about the need for specific types of workers, the training preferred for a specific occupation, or changing job requirements.

The Plastics Education Foundation is an example of an organization which has collected extensive data about the occupations of the plastics industry. They have produced a booklet entitled Need for Plastics Education in which the types of personnel needed, production estimates, employer information, and preferred training is delineated (Waite no date).

The Encyclopedia of Associations can be a useful guide

to locating national organizations which may have facts concerning related occupations (Yates and Akey 1979). Or, one can locate local organizations by checking the yellow pages of the telephone directory under "Associations".

Another source of information concerning "new and emerging occupations" is expert testimony. This can be accomplished through individual or group means. Speaking or corresponding with presidents or personnel directors of firms which employ persons in new occupational titles is quite valuable. Although it would not be advisable to make firm decisions on the basis of one individual's opinion, often these types of persons have the most relevant ideas and facts on the subject. Or, teachers or professors who are doing research on an occupation for curriculum development purposes can be helpful.

One may also wish to organize a convening of experts in order to obtain a concensus of opinion regarding an emerging occupation. In Columbus, Ohio, The Emerging Manpower Project for the Assessment and Coordination of Training (EMPACT) organized a group of community leaders to participate in a structured group discussion called nominal group process. The leaders addressed the question, "What are the primary new and changing occupations in Central Ohio?" (Russell 1979). Nominal group process is a means of acheiving concensus with a group. It utilizes brain-storming, discussion, ranking, and a final priority voting

on an issue. Nominal groups avoid some of the problems of traditional committeees such as domination by one member, or the band-wagon affect (Huber 1972). Nominal group processes have their origination in the delphi methodology which was developed by the Rand Corporation in the 1950's as a futures forecasting tool (Linstone 1978). Therefore, both nominal group and delphi can be an appropriate means for identifying new and emerging occupations.

The occupation, "long-term health care technician", was conceived at a convening of experts in the health care field that was sponsored by the National Center for Research in Vocational Education (Forgione and Kopp 1979). Whether or not the job will actually come into being with standardized training requirements and licensure is yet to be seen. However, the fact that an influential group of persons came to the concensus that "long-term health care technician" was a viable and needed new occupation indicates an important need in the health manpower field.

Occupational Projections

Indicators of occupational growth which should be examined by anyone studying new and emerging occupations are the occupational projections of traditional jobs. They can provide clues about industrial growth and related occupational growth, even if the new and emerging occupation in question is not one for which a projection is provided.

The primary source for these projections is the Bureau of

Labor Statistics of the United States Department of Labor. The Bureau of Labor Statistics data are determined through a process of:

1) extrapolating wage and salary employment data by industry to some future point in time;
2) adjusting of wage and salary employment data to the total civilian labor force as defined by the Bureau of the Census;
3) outlining job requirements resulting from expected economic change; and
4) delineating job requirements by occupation due to separation (people leaving their job for one reason or another) and combining the data with that from step 3, above, to yield net openings (Ohio Bureau of Employment Services 1978).

These extrapolations assume no major changes in the U.S. economy, nor in social, technological or scientific developments which could drastically affect society. The possibility of major wars or long-lasting energy shortages is not allowed for within these projections.

Each state's employment service agency can modify the national projection process to develop statewide projections by occupation and industry. Projections for regions of a state or large metropolitan areas can be computed similarly. The data, however, become less reliable as they are computed for smaller population bases. Growth data

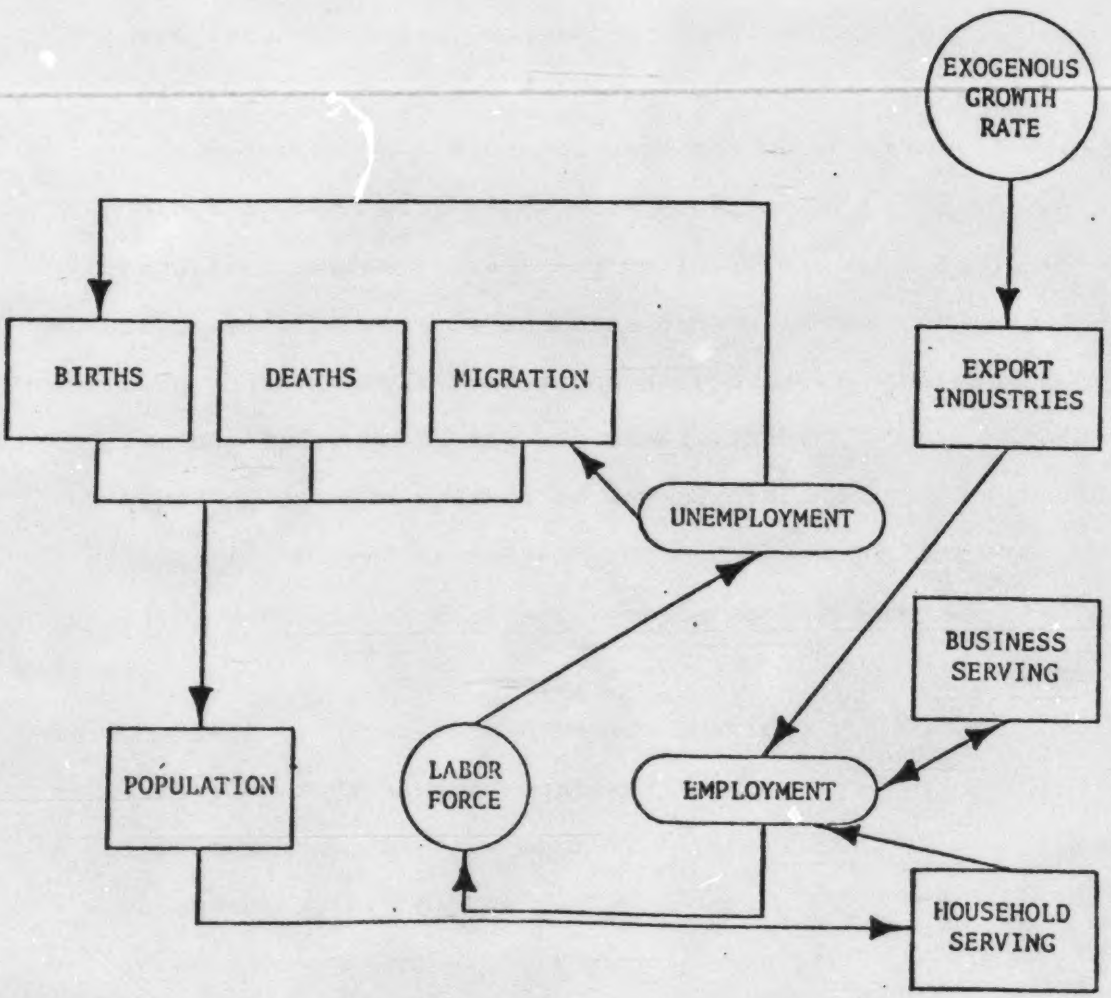
for occupations and industries at a local level are often difficult to obtain; but, even statewide or national level data can show meaningful trends. For example, at a national level the growth projected for dental hygienists through 1985 is 118 percent (as opposed to an average 19 percent growth for all occupations) (U.S. Department of Labor no date). One reason for this growth might be changing insurance coverage benefits for group plans nationally which increase the demand for dental services, making hygienists more valuable to dentists. Regardless, one may assume that the need for dental hygienists in a specific community might be growing also, unless it is located in a highly atypical area of the country or other factors are intervening. Further investigation of the situation locally might prove useful.

Other occupational projections may be available for examination also. State departments, particularly those working with economic development activities, often develop mid-decade population and industry/occupation projections. These projections may have the benefit of more current information concerning the economy.

Within the State of Ohio, one state department contracted for a county by county set of occupational and employment projections to be developed by Battelle Memorial Institute. Following in Figure 2 is a graphic model of the process involved in Battelle's demographic and economic

FIGURE 2

REGIONAL ECONOMIC AND DEMOGRAPHIC MODEL (DEMOS)



projections (1977). Similar types of activities take place within most states. In fact, Chambers of Commerce, metropolitan development offices, and Comprehensive Employment and Training Act (CETA) Prime Sponsors may have occupational projections data which were created for their own planning purposes. In most cases these data are available to the public, although often not publicized. However, it may be necessary to examine the data on-site or to pay for reproduction.

State Occupational Information Coordinating Committees (SOICCs) are established within each state and should be an excellent source of information regarding these types of projection data. This nationwide system was designed to encourage planning and development of employment programs, based on labor supply and demand, that reflect realistic assessments of available job opportunities and employment trends (Kentucky Occupational Information Coordination Committee 1979). The SOICCs may be located in one of any number of state departments: Education, Labor, Employment Services, or Administrative Services.

Employer Surveys

Information concerning occupational growth and new and emerging job titles can be obtained through surveys of employers. At a national level this process is accomplished by the Occupational Employment Statistics Survey (U.S. Department of Labor no date). Surveys of employers

can also be designed and conducted at the local level and can generate very useful information.

The Occupational Employment Statistics Survey is administered by state employment service agencies in most of the states of the country. It is a periodic mail survey of non-farm establishments which gathers wage and salary employment information by occupation. Manufacturing firms are surveyed the first year of a three year cycle, and nonmanufacturing and trades establishments are surveyed the second and third years. Employers supplying the information by occupation are permitted to list occupations which do not correspond with the survey's categories at the conclusion of the survey. In some cases occupations found in this residual grouping are simply different titles for a job which is listed. However, in other cases they may be new or emerging occupations.

A survey of employers at the local level can serve several purposes in addition to exploring new and emerging occupations or occupational growth. It helps to establish rapport with the business community, and provides answers to questions regarding such issues as recruiting practices, or preferred training content which may vary from area to area. Surveys of employers at a local level can be very comprehensive. They can be in-person interviews and can even include a total population of related businesses which is rarely, if ever, possible on a larger geographic scope.

Project EMPACT of Columbus Technical Institute surveyed employers about occupations that had been previously determined to be new and emerging (Russell 1979). One can also design a survey so as to have the employers point out the new and emerging occupations. A literature search, especially one using Educational Resources Information Center (ERIC), will result in examples of similar survey studies which have been conducted throughout the country.

Although many employers welcome the opportunity to provide input into vocational education planning, others fear that information important to their competitors might become accessible through a study of expected occupational growth. Another problem with surveys of employers is that of all self-reporting studies--bias. An employer may hope a new product or service will be in large demand in the future and therefore cause a greater need for appropriately trained individuals; but their hopes may not materialize.

The types of questions asked in an employer survey should essentially cover parts or all of the seven points about emerging occupations that were mentioned earlier in this paper:

- job functions, duties, and specifications
- education and training requirements
- employment outlook
- employment settings
- career advancement opportunities

- available curriculum
- knowledgeable agencies and individuals

Employer surveys are one way of collecting information in order to identify and analyze new and emerging occupations. Studying existing occupational projections, talking with experts, corresponding with organizations, and monitoring legislative, economic, social and technological trends are also necessary in this process. However, suppose one has collected all the required sets of data about an occupation; is satisfied the demand is large or growing and that the educational supply is inadequate; and feels assured that employers would hire graduates from a program to train people in this given occupation--should a new program be developed? Other criteria need to be examined prior to new program implementation.

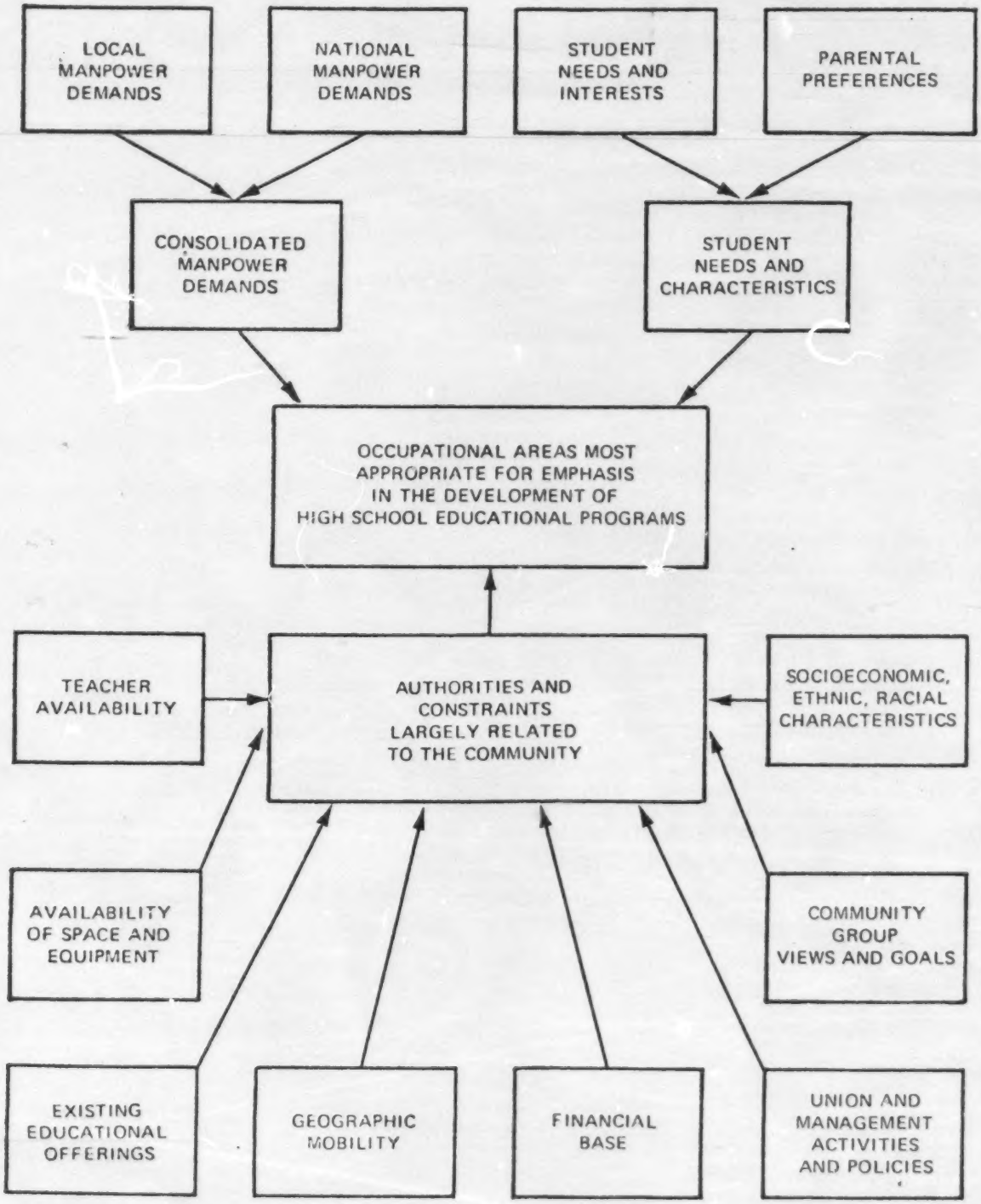
Considerations Before Starting A New Program

Even when an occupation seems to be a perfect choice for program development (as defined by job description, education and training requirements, employment outlook and settings, career opportunities, and curriculum or program availablility), there are other factors which need to be examined before making the decision to start a new occupational training program.

Figure 3 identifies the criteria for selection of occupational areas appropriate for development of high

FIGURE 3

CRITERIA FOR SELECTION OF OCCUPATIONAL AREAS APPROPRIATE FOR EMPHASIS IN THE DEVELOPMENT OF HIGH SCHOOL EDUCATIONAL PROGRAMS


LOCAL MANPOWER DEMANDS
NATIONAL MANPOWER DEMANDS
STUDENT NEEDS AND INTERESTS
PARENTAL PREFERENCES
CONSOLIDATED MANPOWER DEMANDS
STUDENT NEEDS AND CHARACTERISTICS
OCCUPATIONAL AREAS MOST APPROPRIATE FOR EMPHASIS IN THE DEVELOPMENT OF HIGH SCHOOL EDUCATIONAL PROGRAMS
TEACHER AVAILABILITY
AUTHORITIES AND CONSTRAINTS LARGELY RELATED TO THE COMMUNITY
SOCIOECONOMIC, ETHNIC, RACIAL CHARACTERISTICS
AVAILABILITY OF SPACE AND EQUIPMENT
COMMUNITY GROUP VIEWS AND GOALS
EXISTING EDUCATIONAL OFFERINGS
GEOGRAPHIC MOBILITY
FINANCIAL BASE
UNION AND MANAGEMENT ACTIVITIES AND POLICIES

school education programs determined by Arnold and Ferguson (1973). Their model includes the following considerations: manpower demands, student's needs and characteristics, resource availability, community views towards the occupation, employer and labor organization's views of the occupation, and existing programs. These same criteria seem applicable to other types of vocational education programs, such as those found in two-year technical colleges, though some of the factors might differ as to degree of influence (e.g. parental preferences). Although all of these factors will not be discussed in depth within this paper, they must be considered as a part of the process of identifying and analyzing a new and emerging occupation and developing an educational program to meet the need for trained workers.

Examples of New Occupations

The findings of any study attempting to identify new and emerging occupations can be generalizable only for the locale in which the study was conducted. However, some of the conclusions from national, state-wide, and local studies will be presented so the reader may know the types of occupations which have been identified in the past as new or emerging.

The National Center for Research in Vocational

Education has been identifying new and changing occupations which may have need for curriculum development over a three year period (1978-1980). Following are some of the new and changing job titles and occupational areas presented in the annual reports of the study:

- computer drafting/graphics technician
- cable television technician
- speech-language hearing assistant
- catfish farm manager
- locksmith (electronic security specialist)
- word processing specialist
- fiber optics related occupations
- hydroponic agriculture specialist
- microprocessing related occupations
- energy related occupations
- case manager for mentally disabled individuals residing in the community
- laser/electro-optics technician
- long-term health care technician
- multi-competency technician
- diagnostic medical sonographer

(Forgione and Kopp 1979) (Orth and Russell 1980) (Russell 1981)

In 1978 the Illinois Office of Education contracted with Conserva, Inc. to conduct an analysis of current and future employment opportunities in new and emerging

occupations within Illinois. The conclusions identified the following occupations:

- biomedical equipment technician
- industrial hygiene technician
- podiatric assistant
- theraputic recreation technician
- swine confinement facility assistant manager
- solar energy technician
- halfway house resident manager

(Drewes 1978)

An earlier national study was completed for the U.S. Office of Education by Contract Research Corporation in 1976. Occupations selected at that time as new and emerging included:

- child advocate
- energy efficiency technician
- horticulture therapy aide
- nuclear quality assurance inspector
- physical security technician
- housing rehabilitation specialist
- public safety communications operator

(Meleen et al. 1976)

A county-wide study in California found the following new and emerging occupations to be lacking in curricula:

- public safety assistant
- career guidance technician
- leisure counselor
- word processing specialist and supervisor
- solar installer
- fast food service unit supervisor

(Orange County Department of Education 1979)

The applicability of any new occupation to a specific community is dependent upon local demand for human resources.

Summary

Locating and assessing new and emerging occupations is a required task for those vocational/technical educators who want to prepare for meeting the needs for skilled workers in the future as well as for those currently in demand. The process is on-going. Contact with a wide range of people and organizations is required.

More than a new and emerging job title is required. Information concerning job duties, education and training requirements, employment outlook data, employment settings, career opportunities, agencies and individuals to contact, and existing program offerings all must be assessed when examining a new occupation.

One must monitor state and national legislation and resulting policy implications in order to remain up-to-date

on emerging occupations. Changing economic conditions and social values affect new jobs also. Technological developments in particular can create different occupations and demands for new types of skilled workers.

Employers, professional associations and special interest groups often have unique information about jobs. Newsletters and publications from these sources can be useful, as can personal conversation or correspondance regarding a new and emerging occupation.

Occupational projections available from both traditional and less expected sources should be analyzed by the vocational/technical education planner even though 'new' jobs as a category may not be included. State Occupational Information Coordinating Committees may be especially helpful. Or, surveys of employers can provide occupational projection data as well as other information needed to plan for vocational/technical training. However, local factors must be taken into account prior to implementation of a program even for what appears to be the perfect new and emerging occupation.

The process of identifying and analyzing new and emerging occupations is complex and can be time consuming; but being prepared to meet the demand for the skilled workers of the future is necessary for the continued success of vocational and technical education.

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